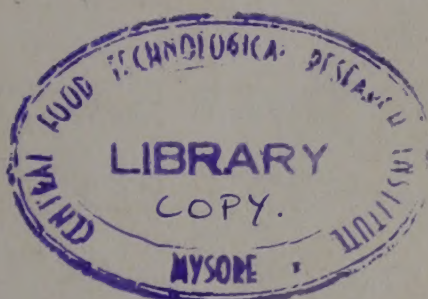


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PART III. TECHNICAL NEWS BRIEF

B;9A Food additive GUAR GUM ADDITIVE COST

Hydrophillic colloids (algin gum, tragacanth, locust gum, gelatin, etc) have been used as food mix additives for some time. Because of its ready availability and low cost, guar gum would appear to be one of the potentially most attractive of such materials. But it lacks tolerance to variations in the parameters of mix manufacture and in the baking of finished cakes.

Now however cake mixes with superior performance characteristics can be made by incorporating at least one of the derivatives of guar gum selected from the group consisting of the hydroxy and salts of carboxy alkyls. Surprisingly, these derivatives are more tolerant to deviations from optimum mix manufacture and baking parameters than is the parent compounds - Mao H. Yueh, Minneapolis, Minn, to the Pillsbury Co, Minneapolis, Minn. U.S. Patent No. 3, 222, 185. (Food Engin Oct. 1967;141).

B;9V6;b12;a86 Food, Cyclamates CYCLAMATES IN FOODS

The UK Minister of Agriculture, Fisheries and Food recently gave notice of new regulations that will govern the use of cyclamates in food in the United Kingdom.

The new regulations will be contained in the Artificial Sweeteners in Food Regulations (1967) which will enact the proposals for revised regulations published in Feb. 1966. The main changes which the new regulations will make over the existing legislation are as follows:-

-) The use of cyclamates in artificial sweetening tablets will be permitted from 1st Aug. 1967.
-) Saccharin tablets, cyclamate tablets and saccharin/cyclamate tablets will have to comply with prescribed compositional and labelling requirements.
-) The use of cyclamates in manufactured foods (except ice cream and soft drinks) will be permitted without limitation from 1st Dec. 1967.
-) Specifications of purity for saccharin and cyclamates will be laid down.

The use of artificial sweeteners in ice cream is prohibited by the Food Standards (Ice cream) regulations, 1959. The use of cyclamates in soft drinks is permitted within prescribed limits by the Soft Drinks Regulations 1964. (Food Tech Austral 19(14);1967;659.),

F39E1,ZQC;eF31 Potato, Chipped, Flavour
65 Compounds make up potato chip flavor

There are 65 distinct chemical compounds that make up the flavor of potato chips and all but a few of these have a pleasant individual aroma.

Seven derivatives of pyrazine are felt to be the most important of the volatile flavor compounds identified. These pleasant-tasting compounds are the backbone of good chip flavor. One of the group of monocarbonyls called 2,4-decadienal, is important to fresh flavor. Its concentration in fresh potato chips is far greater than that of any of the other monocarbonyls rest of the monocarbonyls are apparently undesirable flavor components, since their concentration was consistently higher in stale chips than in fresh chips. One is not found in fresh chips at all.

Five volatile compounds with unpleasant and objectionable flavors are bound to potato chips. These include pyridine and ~~xx~~ four benzene derivatives. Among other compounds found are furan derivatives. They appear to be of great importance to chip flavor -- Presented by Dr. Stephen S. Chang, Rutgers, the State University, New Brunswick, N.J. at the 17th National Potato Utilization Conference. Food Engin Oct. 1967.

F39H,ZF4;eF31 Dried,~~xx~~ Fruit, Flavour
RETURNS FRESH FLAVOR TO DRIED FRUIT

Essential natural fresh flavor can be restored to dried fruits by using enzymes obtained from the processing wastes. This is an advantage of a process for preserving fruit to be incorporated into various culinary mixes, frostings, ice cream, cookies etc.

The process: The edible fleshly protein of the fruit is separated from the waste materials and treated with a sweetening materil (preferably sucrose). The fruit flesh can be comminuted or pulped to permit the sucrose to infiltrate it more easily. The treated fleshly portion then is dried to a moisture content of 15%. At the same time flavorese enzymes are extracted from the waste materials and dried to a moisture content of below about 5% by weight. Briefly, the enzymes are extracted by comminuting the waste materials, extracting them with water, and precipitating the enzymes.

When water and enzymes are added to the dried product, the reconstituted fruit will have essentially the flavor of the original fresh fruit.

Werner J. Metzger and Fredrick J. Baur, Cincinnati, Ohio, to the Procter & Gamble Co, Cincinnati, Ohio, U.S. Patent No.3, 224886. Food Engin Oct. 1967;139.

F39R1,ZX Tomatoes, Graded
MASS GRADING SYSTEM FOR MECHANICALLY HARVESTED TOMATOES

Scientists at the University of Arkansas Agricultural Experiment Station (Fayetteville) have developed a rapid method of grading mechanically harvested tomatoes. According to Dr. A.A. Kattan, horticulturist, and R.H. Benedict, agricultural engineer, this new grading method is a flotation system based on fruit density.

In this new system the tomatoes are put into a liquid media and the fruits separate into layers according to degrees of ripeness. This separation is a result of tomatoes of different degrees of ripeness having different specific gravities. In other words, tomatoes at one stage of ripeness will sink to another level.

Aside from eliminating the excessive manual labor that is presently used to remove under ripe fruits from the mechanically harvested tomatoes this system also separates the usable portion of the raw production to various categories of ripeness prior to processing. This technique has proven successful over a wide range of tomato varieties and cultural conditions in Arkansas.

Work to refine this method of mass grading will continue, and later results will be reported in more detail by the experiment station. (Canning Trade 90(9);1967;13).

F39793 Honey A HONEY SUGAR SYRUP

You can make a clear, pourable syrup combining the taste impact of honey and sugar, yet which is free of insoluble residue and is storage stable. Solution is blended at 145-1-65F first, then temperature is raised to 165-175F for filtering and filling. Filled containers are kept at 165-175F for about 5 min to ensure a sterile product. Finished product is a stable pourable, clear aqueous solution containing from 1% to 30% honey and 70% or more sugar. Harry Topalian Dover, Del, to General Foods Corp, White Plains, N.Y. U.S. Patent No.3, 294552. (Food Engin 1967;145.)

F39ZR;9D91F Jam and Jelly, Ffumaric acid FUMARIC ACID PERMITTED IN JAMS AND JELLIES

Under the terms of an order published in the Federal Register of October 13, Fumaric acid "in a quantity which reasonably compensates for deficiency, if any of the natural acidity of the fruit juice ingredient" becomes an optional ingredient in fruit jelly, fruit preserves or jams, artificially sweetened fruit jelly and artificially sweetened preserves, or artificially sweetened fruit jams. Except as to any provisions that may be stayed by the filing of objections within 30 days, the order becomes effective 60 days from the date of its publication in the Federal Register. (Canning Trade 90(9);1967;13).

F3F;961;b12:fD Cookie, Fat, Quantity, Analysis A REFRACTOMETRIC METHOD OF ESTIMATION OF FAT IN COOKIES AND BAKERY PRODUCTS

Official and reference methods of analysis for fat in baked products involve a preliminary acid hydrolysis step prior to solvent extraction and the extracted material is defined as fat (acid hydrolysis method) or true lipids. Products of direct extraction with solvents have been defined as unbound lipid or crude fat. All methods are time consuming and a rapid, reproducible technique for use as a quality control procedure has long been required in the baking industry.

The refractometric technique is based on the fact that the concentration of a solution of a fat in tri-cresylphosphate (TCP) is linearly related to the refractive index (RI) of the solution within stated limits.

For an unknown fat the method consists of two parts, first the extraction of some fat from the product and the preparation of a TCP solution of the fat of known concentration

The separation of a fat sample from the product is expedited by the use of a commercially available enzymes preparation. The RI of this solution together with the RI of TCP enables a calibration curve to be drawn.

Then a second sample of the product is completely extracted with TCP and its RI measured; this enables the concentration of fat in the TCP and hence in the product, to be obtained.

The method is rapid and comparable in accuracy to the Soxhlet extraction method, giving results in terms of unbound lipid. Food Tech Austral 19(14);1967;677.

F3Zc,3 Milk, Instant A NEW INSTANT MILK PROCESS

Connecticut milk producers association is using a recently developed foam spray-drying process to produce 400,000 lb of instant dry non-fat milk per year. The instantly dispersible product, produced directly in the spray-dryer, requires no instantizing step. This in turn eliminates the need for bulky and expensive instantizing equipment and reduces manufacturing costs.

The product is spray dried as a foam by compressed air 200 psi, entering the concentrate in a mixing tea between the high-pressure pump and the spray nozzle. The structure of the product can be controlled by the type and amount of gas injected into the feed line. Hourly production capacity of the dryer is doubled and product quality compares favourably with conventional instant dry nonfat milk. Current experimental work shows that puffing the concentrate with nitrogen before spraying and holding the powder in the complete absence of oxygen prevents the development of oxidized flavours. (Food Tech Austral 19(14);1967;695.).

F3Zc,ZQL Milk, Powdered MODIFIES POWDERED MILK

A modified nonfat dry milk powder has good dispersability, flowability, wettability and displays minimal tendency to foam upon mixing with water. At the same time powder has good stability, flavor and absence of greasiness. Moreover, the rate of production is markedly increased and the percentage of fines significantly reduced.

To make the product, liquid anhydrous lecithin, preferably diluted with a vegetable oil, is mixed thoroughly with warm non-fat dry milk solids in an amount from 0.033% to 0.066% active lecithin, based on the weight of the total solids. Then product is increased in bulk density, preferably by being moistened and agglomerated.

Using such a low level of lecithin avoids the undesirable off-flavor, greasiness and instability encountered when using larger quantities of lecithin with non-dry milk solids - George A. Danisch, Jr. Syracuse and Richard A. Johnson, Dewitt, N.Y. to the Borden Co. N.York City U.S. Patent No.3, 238,045. (Food Engineering Oct. 1967.

F3ZK1,ZE Wine, Package MAJOR BREAKTHROUGH IN WINE PACKS

After two year's research and experimentation, an Australian wine company has succeeded in designing a bulk table wine container holding one gallon, which can be tapped as required without allowing air to enter and spoil the remaining contents by oxidation.

his major breakthrough in consumer wine packs has been made by Penfolds wines, and is thought to be a world first. The company have taken out Australian and Overseas patents on the pack.

The new pack, labelled Penfolds Table Cask consists of a metal outer with an inner of laminated plastic film, an inert material that is as suitable as glass for protecting wine against contamination. A small plastic rack is supplied for supporting the cask on the table.

For tapping, a small plastic spigot is provided with each cask; a small seal at one end of the cask is removed and the spigot inserted.

The outer cask is printed in similitude of a harked oak cask, making an attractive dispenser. Different coloured printing on the sales pack helps to identify the wine type. The current liquor laws in N.S.W. prevent sales of these casks in that State. (Food Tech Austral 19(14); 1967;693).

3Z1,ZF4 Meat, Dried PREVENTS CASE HARDENING OF DRIED MEATS

Surface drying or case hardening produces a dried meat product which may be 'gummy' in texture and have very poor rehydration properties. This case hardening can be avoided by impregnating the meat with an edible colloid such as gelatin, starch, carrageenin, agar, gum tragacanth, etc. The product formed has excellent flavor and texture characteristics and in some instances almost doubles its weight on rehydration.

The minor amount of colloid used is sufficient to coat each surface area with edible film through which moisture diffuses during the hot air drying. This colloidal film prevents excessive desiccation of the meat surface itself. It also helps a dried product with a substantially uniform moisture content throughout.

Preferably, the meat to be dried is sliced in thin sheets or strips which are then cooked in a dilute solution (perhaps 1%) of edible colloid. Cooking time and temperature vary with the colloid used. After cooking the meat pieces are removed from the solution and dried -- Joseph L. Hank, Tinley Park, Ill., to Swift & Co, Chicago, US Patent No.3,241,982. Food Engin Oct. 1967;139.

9C:461 Child, Malnutrition THE INTERNATIONAL CONFERENCE ON PREVENTION OF MALNUTRITION IN THE PRE SCHOOL CHILD ESTABLISHED THAT:

The growth potential of children afflicted with malnutrition and disease in every likelihood is never reached.

A child inherits an assortment of genes which predetermines his potential but each phase of his development is influenced by the inter-play of inheritance and environmental exposures.

Malnutrition in the mother may handicap a child from birth. The foetus, however, does have first priority on the mother's resources and will achieve normal birth weight and normal development at the expense of the mother.

Growth of underprivileged children is accelerated with improved nutrition and environment care. Food Tech Austral 19(14);1967;659.).

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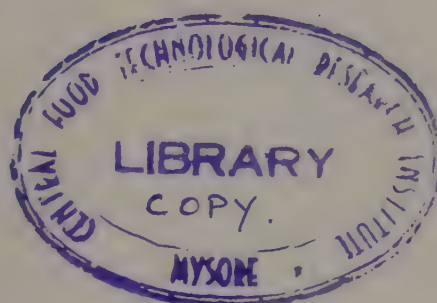
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PART III. TECHNICAL NEW BRIEF

F3 Food Technology

AEROSOL FOODS STUDY

What would be your reaction to a meat spread in an aerosol spray can? Would you be interested in buying it? Would you find it believable?

The marketing Research and Planning Section of the "Freon" products Division of the Du Pont Co. has conducted an exhaustive study of these questions in relation to forty foods which are possibilities for production in aerosol cans. The foods ranged from catsup to sour cream to cocktail mixes.

The research was conducted through the use of preselected and controlled mail panels. Four balanced panels of 1,000 households were used, with each household evaluating ten of the forty concepts. These are the results.

Items such as food seasonings (catsup, mustard) and flavor toppings (which are already on the market) rated at the top of the net buying interest, Hollandaise sauce, meat spreads, cocktail mixes, instant coffee and tea mixes and nocalorie sweeteners rated lowest.

Aerosol whipped cream toppings, milk flavorings, and decorative icings are believable to most people. These items are, however, currently being marketed, which had a great deal to do with their acceptance. Instant coffee and tea concentrates, chiffon pie fillings, instant peanut butter, Hollandaise sauce, spice essence, meat spreads, cocktail mix concentrates, and angel food cake batters were considered not believable by more than one-half the respondents. Canner Packer 136;1967;16.

E973 Vitamin C1 LIGHT SPRAY

A light spray of ascorbic acid (Vitamin C) could aid mechanical harvest of olive trees since it will loosen olives from the stem. However, the humidity must be high before it works. According to Dr. Hudson Hartmann of the Davis campus of the University of California, several rainy, muggy, foggy days in a row after spraying bring the best results. Unfortunately, without the high humidity the spray does not work. This is the first extensive test of a system that has worked surprisingly well in Florida on citrus trees, but where the humidity is usually relatively high. Will other chemicals work? Possibly, said Dr. Hartmann, but the effective ones also tend to defoliate the tree, which prevents a crop the next year. Also he warned many other chemicals might have a graver problem in gaining acceptance as a residual on the fruit. Canner Packer 136;1967;9

The question of "how" does one taste has more of an answer now. According to scientists at Monsanto laboratory in Everett, Mass, the sequence is this: When the food is eaten, the sugar forms a bond with a protein in the "Sweet" receptors in the tongue. The strength of the bond is in direct proportion with the strength of the sweet stimulus. The work was done with pigs and cows but may give laboratory men a new tool in modifying the sweetness or bitterness of foods. Canner Packer 136;1967;9.

F39H Fruit FRUIT PICKED

Fruit picked by machines should be processed differently than fruit picked by hand. Machine picked red cherries should be canned much more quickly, one Michigan packer believes. They should be inspected and the badly bruised cherries removed. Part of the problem of converting to a mechanical harvester, he believes, is that packers are still trying to handle machine picked fruit as if it were hand picked. Canner Packer 136;1967;9.

M98 Packaging MODERN PACKAGING FILMS

Besides the editor some 11 authors contributed to the production of this manuscript. The subject is dealt with in more detail than is normally required by a food technologist but nevertheless it is useful reading where packaging as a subject is one of the main lines of interest.

The layour of the test is logical, starting with an account of early days of film and examining each main class of film in separate chapters. Production, properties and packaging applications of polyethylene, polypropylene, polystyrone, cellular polystyrene and Pvc film are examined. Other chapters cover the heat shrinkable films, physical testing of polymer films, printing and adhesion of polymer films, cold-seal coating of polypropylene and other films, and the adaptation of machines to run with these films. Food Tr Rev 37;1967;86.

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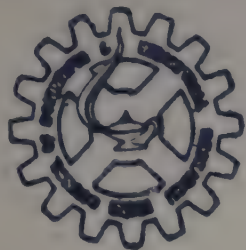
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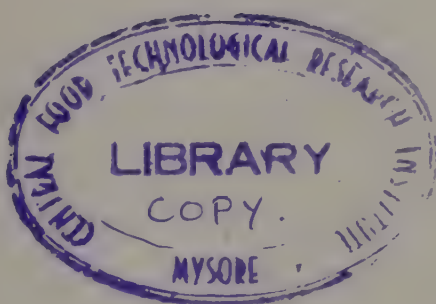
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Structural changes of flavylum salts. III. Polarographic and spectrometric examination of 3,7,4-trihydroxyflavylum perchlorate.
- PART III. TECHNICAL NEW/BRIEF
- CONTINUING SEARCH FOR PROTEIN SOURCES
- MADISON, Wis.-A severe world food shortage may be only decades away. When it comes, the main problem will be a shortage of protein, according to University of Wisconsin

biochemist, Mark Stahmann. Stahmann, F.J. Oelshlegel and J.R. Schroeder are investigating one possible solution - a high-protein concentrate made from alfalfa.

The threatening protein shortage has prompted scientists to explore numerous potential sources. Protein may someday be made from petroleum waste products, algae, soybean seed, or high lysine corn, for example. Oelshlegel and Schroeder are working with beet greens and carrot tops, too.

Right now, man gets high protein in foods made from plants or animals. Most of it originally comes from amino acids synthesized through photosynthesis in the leaves of green plants. Canad Food Indus 38;1967;7,

F308:XP,F4 Grain, Drying GRAIN-DRYING AND STORAGE SILOS

A range of round grain drying silos in various sizes from 27 tons to 105 tons capacity, and storage silos in sizes ranging from 30 tons to 410 tons capacity, will be exhibited at the Royal Smithfield show.

The silos are waterproof and are designed to resist vermin and insects. Walls are formed from curved sheeting of galvanised corrugated steel, bolted along all vertical joints. All wall seams are sealed with mastic strip, and rubber-backed washers make the bolt holes waterproof. A door 6 ft. X 2 ft. 3 in. (1.8 m. X 0.7 m.) is fitted to provide access for cleaning the silos, the inner door being made from strengthened removable interlocking slats designed to withstand the full pressure of the grain. Deeply pressed steel sheets form the rigid self-supporting roof which has a 26° pitch. Access through the roof ladder is supplied. A glass fibre filling cap is fitted to the top of the roof.

The standard design of the drying silos has a floor constructed from galvanised open mesh steel sheet resting on supports approximately 1 ft. (30 cm) above the concrete foundation. This forms a plenum chamber into which warm air enters through special ducting fitted with adjustable slides for controlling the air flow. Wet grain may be dried in layers of up to 10 ft. (3 m.) in depth, with an overall moisture extraction rate of at least 1/2% per day. The planter's Chronicle 63;1968;78.

F31:d2,QJ Rice, Milling THE SEM RICE MILLING PROCESS

The process was invented by Mr. Truman B. Wayne in conjunction with the R&D Dept. of Riviana Foods, Inc and has been introduced in their Mill at Abbeville, Louisiana, USA. In the SEM Process the rough rice is dehulled or shelled by conventional methods. The bran layers of the cleaned hulled rice (brown rice) are chemically softened by uniform application of closely controlled amounts of rice oil. The treated brown rice is allowed to condition for a specified period of time, while the oil permeates the bran membranes and softening is accomplished. It is then conveyed to modified conventional milling machines where the bran layers are removed. The rice is milled in the presence of an oily solvent

(rice oil/hexane miscella). This miscella acts as a washing or rinsing medium to aid in flushing the bran away from the rice. It lends lubricity and prevents increase in rice temperature. The factors reduce the amount of pressure required during bran removal and thus prevent breakage.

Superheated hexane vapour is used to flash evaporate the bulk on the hexane remaining on the rice. Subsequently the rice is subjected to a flow of inert gas which removes the last traces of solvent.

The bran rice miscella is conveyed to vessels, where it is allowed to settle. This enables the extraction of the oil to be completed. The concentrated bran is conveyed to additional settling/extraction vessels before finally being centrifugally separated while being rinsed with hexane for final oil removal. This relatively solvent free bran is conveyed into a flash desolventising system where the last traces of solvent are removed. It is then pneumatically conveyed through cooling, cyclones and into conventional handling equipment. Oil rich miscella obtained from the tops of the bran settling vessels is centrifuged and the centrifugate is fed to additional solids removal equipment. The non fat solids are removed from the rice oil centrifugally, 2.5 lb of oil are obtained from each barrel of rice milled. The bran contains 17-20 per cent protein and less than 1.5 per cent fat. It is creamy white in colour and much more stable.

Besides an increased yield of whole grain rice, SEM milled rice is whiter, has less fat and a longer shelf life, it is claimed. The continuous process also provides rice oil and valuable proteins from rice bran which are not gleaned from the grain by usual milling methods. Food Trade Review 38(1);1968;63.

F39H:xP,EO(D9a) Fruit, Canning
SHOW INTEREST IN LOW COST UNIT FOR CANNING FRUIT

SUMMERLAND, B.C. - Scientists at the CDA's Research Station here have introduced a new twist to fruit processing.

And, reports food technologist J.A. Kitson of the Summerland station, the technique markedly improves the quality of fruit packed in the large, 100-fluid-ounce containers generally used by institutions. While availability of processed fruit in this size of can offers advantages for the large-scale purchasers, conventional processing of this container requires a longer cooking period and this impairs quality of the fruit to some degree.

The new twist in processing is provided by a Rolltherm cooker developed by specialists at the CDA's station. The unit speeds the cooking process by spinning the cans to agitate the contents.

Peaches, pears, apricots and cherries in 100-ounce cans can be cooked in the Rolltherm unit in a quarter of the time required with older, non-agitating cookers, the food technologist reports. Peach halved, for example, take only 15 minutes instead of an hour.

The result: better flavor, firmer fruit, and greater clarity of the syrup.

"The improved processing method will make it possible for institutions to buy the large size cans and obtain fruit of the same quality as that in the 14-ounce cans produced for home consumption," Mr. Kitson explains.

The cooker is simple in design, consisting of a long, narrow box equipped with a moving belt and a conveyor. The cans are placed on their sides on the belt and held in place by the cross bars of the conveyor which moves them slowly through boiling water in the cooker. The belt, moving at a higher speed than the conveyor, spins the cans and this mixes the fruit and syrup.

Rate of spin varies with the container size, from slow for the large cans to fast for the small ones. Researchers at Summerland found that most fruits in the 100-ounce cans cooked fastest when they were rotated at 20 revolutions per minute.

The agitation provided by the Rolltherm unit not only slashes cooking time but also results in an evenly cooked product and little impairment of quality, Mr. Kitson says. The syrup is exceptionally clear, and color and flavor of the fruit compare favourably with that packed in the fast-cooking 14-ounce cans.

For the smaller processor, the Rolltherm offers some special advantages: simplicity of the unit, and a cost that is relatively low compared with that for the larger, imported automatic cookers now used in Canada. *Canad Food Indus* 39(1);1963;24.

F39Q1;a244 Banana Disease
BLOCK END ROT

Block end rot of bananas caused by the fungus *Gloeosporium musarum*, a cause of serious loss to the Australian banana industry, can be prevented by dipping the freshly harvested fruit in a dilute solution of thiobendazole. Out of 24 hands of bananas treated in this way only three subsequently developed black-end, whereas 25 out of 37 treated with the accepted fungicide, Shirland, were ruined by the disease. Protection lasted for the full marketing period-from harvest until the bananas were ripe for eating a week or more later. Food scientists at the New South Wales Department of Agriculture who conducted the test, point out that thiobendazole is well tolerated by a wide variety of animals; they are exploring the possibility that thiobendazole sprays can penetrate the leaves of plants and act as systemic poisoning to destroy eelworms and other plant nematodes. *Science J* 3(11);1967;19.

F3C:d2. Bread, Production
BREADMAKING, ITS PRINCIPLES AND PRACTICE

Bennion's "Breadmaking" has been a standard textbook in bakery schools for nearly 40 years. It does not purport to be a comprehensive treatise on the science and technology of breadmaking but aims to provide bakery students with an adequate depth of knowledge on the subjects listed in the syllabuses of relevant examinations. This it has done well, but since the publication of the previous edition, the structure and contents of bakery training course have been radically changed and considerable technological advances have taken place.

new edition the book has been recast and expanded to take cognisance of these changes. The emphasis is on the practical side of the subject, which is thoroughly and well presented. The scope of the ancillary sections is adequate but a few mistakes have crept in nitrogen peroxide is not now used to bleach flour as stated on p. 60, lactobacilli are not spore formers (p 68), a bleach figure is not an indication of extraction rate (p 368). However, these are a minor blemish on a book that will certainly retain the reputation it has rightly held among bakery students of past years. Chem & Indus No.45;1967;1912.

F3Z5Z;91 Fish, Protein concentrate
FISH PROTEIN CONCENTRATE FOR HUMANS

STOCKHOLM, Sweden - A large-scale test, using fish protein concentrate as a food additive for human consumption, will be carried out in the near future, following the delivery of 100 kilograms of the concentrate to Ethiopia by the manufacturers - A.B. Astra, the Swedish drug company.

The concentrate (often known as fish flour) is said to be soluble in water and can be utilized in a similar way to powdered milk. The company says it contains 83 per cent full value protein and 13 percent mineral substances.

Originally, Astra developed the system for extracting protein from fishmeal used in animal feeding stuffs, but subsequently the company received approval from the Swedish National Institute for Public Health for its use for human consumption. Canad Food Indus 39;1968;8.

J:4:634 Pesticides
PESTICIDES AND POLLUTION

Dr. Mellanby, a distinguished entomologist now director of the Monks Wood Experimental Station of the Nature Conservancy, has compressed a wide subject into another excellently produced small volume in the New Naturalist series.

He speaks with authority and balanced judgement, yet there is some selection and bias, inevitable in dealing with a natural society so fluid as that of the British countryside. When on balance, he approves the reduction of the rabbit population but regrets the intrusion of hawthorn scrub on the smooth downland, he is caught in one of the internal dilemmas. Many industrial chemists will sympathise with the wish to have conserved as much, and as varied natural life as possible and will want this book on their shelves at home.

Pesticides are not considered as the sole source of pollution. About half the space devoted to them is concerned with combustion products and other industrial and domestic wastes and with radiation. The balance here is perhaps not fairly struck. We are told that motor transport in this country discharges 3000 tons of lead per year into the air but it could have been added that this is rather more than the total of all pesticides (more than half of which is sulphur) and some appraisal of significance could have been expected. A book in this series is of course mainly concerned with the natural world around us but there is also some direct

concern with human health. The effects of non~~a~~pesticide air pollution on human lungs and rat lungs provide the only coloured plates. Chemistry and Industry No.45;1967;1910.

X8(F3ZG51) Tea Industry THE HISTORY OF THE INDIAN TEA INDUSTRY

This book is, we understand, the first complete and fully documented history of the tea industry in India--an industry which has proved of major importance to the economy of that country.

There are 44 chapters of this history, under 11 sections, and these commence with a survey of the historical background of tea from early tea drinking in Europe and Asia to the commercial growing of tea in India. The second section deals with the production of tea and details the changes that have occurred from the commencement of activities in Assam up to the present day. Further sections cover labour in the industry, Scientific Research, Technical Developments, Organisation and Finance, Taxation, Tea Market Expansion propaganda, Transport and communications, Sale and Marketing and the last section deals with the Second World War and the part played by the Tea planters. Some illustrations and maps are including in the book, these latter cover tea districts of the world, the Indian Tea Association Administrative areas. South India, East Pakistan and Assam and Bengal.

Extensive use is made of quotations from original sources, these cover official reports, standard works on the industry, annual reports of various associations and from records of particular companies. Personal knowledge which the writer gained over a period of 26 years, during which he was adviser to the Indian Tea Association either in London or Calcutta has of course, played a big part in covering the more modern part of this history. Food Trade Review 37(11);1967;86.

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E92Z2J Plant protein

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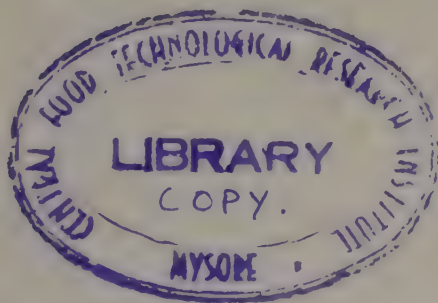
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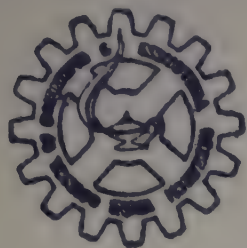
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JUNE 1968

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S.V. Sangameswaran

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F392Z2. Protein FIRST COMMERCIAL PROTEIN-FROM-OIL PLANT

British petroleum is building the first commercial plant for producing microbiological protein from petroleum, at Lavera, France, where BP's French subsidiary has been working on the process since 1960 and where pilot plants have been operating since 1963. BP thus keeps a jump ahead of its two main rivals, shell and Esso (the latter is cooperating with Nestle in this field).

Nutritive value of the protein is good, says BP. It is tasteless and looks like brown sugar, and will initially be incorporated in animal feeds. It is expected to sell for around £55 a ton, making it competitive with fishmeal (£65 a ton) and soyameal (£50). Hopes have been expressed that eventually the protein may be produced wherever there is an oil refinery, which would make it more readily available than fishmeal or soyameal for as long as world petroleum reserves last.

Encouraging as present work is in this field, one feels that the lavish use of the term "breakthrough" by some commentators and forecasts (e.g. by Mr. M.J. Rathbone, former chairman of Standard Oil of New Jersey) that the entire world protein deficit will be wiped out at comparatively little cost are rather exaggerated. (Food Manuf 43;1968; 31).

F3;S1 Food, Toxin OTHER TOXIC FOODS AND MYCOTOXINS

Shellfish and seafoods as a class, went on Dr. Coppock, provide an almost unlimited collection of naturally toxic foods, either in the form of simple but irritating allergies or complex and dangerous poisons. Among many examples which he cited are mussels, which contain an extremely powerful toxic factor and can prove fatal.

Other toxicity phenomena cited include hypervitaminoses caused by excess of the vitamins A and D, the dangers under certain conditions of both a lack and an excess of salt, and the severe physiological effects of thujone, a major component of oil of wormwood which used to be the main flavour of absinthe until it was withdrawn in 1915.

Finally Dr. Coppock dealt with toxic substances produced by microorganisms, one of the most dramatic examples in recent years being aflatoxin produced by *Aspergillus flavus* which first revealed itself by causing the deaths of turkeys fed rations containing groundnut meal from Brazil in 1961. Aflatoxin can cause severe liver damage and malignant tumours in susceptible species and has also been isolated from mouldy bread and the deep litter of poultry houses. Given the right conditions of temperature and humidity *Aspergillus flavus* can yield aflatoxin on **wheat**, soyabeans, rye, oats and indeed any medium providing the **appropriate** nutrients.

The intense carcinogenic properties of aflatoxin have underlined the importance of taking a fresh look at mould contamination of foods in animals, poultry and man, said Dr. Coppock. "It may well be," he said, "that the mouldy top to the home-made jar of jam or marmalade which is carefully lifted off by most housewives has left behind potentially harmful metabolites which have penetrated the 'protective' paper, and that her family are at risk by consuming the contents".

Mycotoxicoeses may be far more prevalent than many imagine, said Dr. Coppock, and the frequency of food and feed contamination in Britain with both *Aspergilli* and *Penicilla* suggests that more effort should be made in identifying toxigenic strains which might lead to poisonous metabolites being present in the feeds of animals and the food of man. "There are clear public health implications involved in mycotoxicoeses and in my view we are backward in the UK in appreciating the potential hazards", said the speaker.

He concluded by making a plea that those responsible for food legislation should require the same standards of safety when natural products are incorporated in new foods as they now do with synthetic food additives. Both are chemicals or biochemicals and require intelligent assay as such. (Food Manufacture 43;1968;31).

F308:xP,C Grain, Storage INFLATABLE SILO TO CUT GRAIN STORAGE LOSSES

When grain is sealed in an airtight container lack of oxygen soon stifles any insect pests it may contain. Since losses from insect degradation in open store can be as high as 50 per cent, inflatable silos, designed to hold approximately 750 tons of cereals under airtight conditions, should prove valuable in all grain producing areas.

The containers, which are corseted in galvanized steelmesh, are made of butyl sheeting, a tough synthetic rubber impervious to gases and resistant to sunlight, moisture and extremes of temperature, so that the silos are usable in any climate. Erection, preferably on concrete, though any firm level ground will do, takes only a day. Grain is fed into the silo via a pneumatic or belt conveyor, after the bag has been inflated to a pressure of 0.125 to 0.25 psi by means of a centrifugal blower. When full, the pressure is released to allow the "roof" to collapse on top of the grain and the entry hatch is sealed. When the grain is needed the silo is reinflated and emptied by suction.

Developed and patented by butyl products of Billericay, Essex, jointly with Cherwell Valley silos of Banbury, Oxfordshire, this system of grain storage has been on trials since 1966. Several materials were

investigated, including building paper, but the butyl sheeting proved both cheap and long-lived. The price works out at less than £2 10s per ton stored, which is considerably cheaper than conventional rigid stores and about half the cost of an on-the-floor store. A unit with a capacity of 750 tons will cost £1,750 and will fit in with needs that change from season to season as it can be easily transported. (New Scientist 37;1968;637).

F3Z5Z;91 Fish protein PROTEIN CONCENTRATE FROM FISH

In the worldwide search for new sources of protein or new methods of producing it, one of the most realistic methods is to transform fish into an odourless and tasteless protein concentrate which can be transported long distances and does not spoil during storage even in tropical climates.

This claim is made by Aktiebolaget Astra of Sodertalje. Sweden, whose fish protein factory at Bua, a fishing community on the west coast of Sweden where a three-shift working system is producing 36 tons of protein concentrate every 24 hours, is said to be the world's first production scale factory designed for this purpose. The factory started operations in 1966.

Initial phase of production at the factory has been devoted to a product intended for animal consumption but future developments envisage a concentrate suitable for human use and trials in this connection are under way. Fish meal is purchased from other factories and arrives at the factory with a fat content of about 10 per cent. The object of the process at Bua is to extract the remaining fat and its flavour. On arrival, the meal is stored in a 65 ft. high 60 ton capacity silo from where it is conveyed to an extraction plant where a solvent is applied to remove the fat. When the solvent and its oil content have been separated, the meal proceeds to a drying plant where it is freed of remaining solvent and odour. The end product is pulverised then transferred to a silo for finished concentrate and is finally chuted into sacks.

For reasons of economy the solvent is cleansed by distillation in a recovery plant and returned for reuse, a by-product of the process being the separated oil which is sold.

The entire manufacturing process is enclosed and neither the fish nor the concentrate is visible at any time. Because of the high degree of automation employed only two men per shift are needed apart from those employed for loading and unloading.

The factory itself is geared to permit rapid changeover to the production of a fish protein concentrate for human consumption. When that occurs, the raw material will be fresh iced fish instead of the industrial fish used at present. (Food Manufacture 43;1968;37).

F3Z5Z,ZQL:d2 Fish, Meal, Production RISE IN PRODUCTION OF FISH MEAL

PRODUCTION of fish meal by the countries reporting to the International Association of Fish Meal Manufacturers rose from 3,189,626 metric tons in 1966 to 3,582,694 tons last year.

Significant changes in individual countries in 1967 were increases by Peru, from 1,470,478 tons in 1966 to 1,815,983 tons; Norway, from 421,725 tons to 491,562 tons; South and South West Africa, from 256,565 tons to 345,000 tons; Denmark, from 107,915 tons to 149,261 tons and Spain, from 27583 tons to 43,600 tons.

In the United States production dropped from 175,586 tons in 1966 to 167,154 tons last year; Icelandic production fell from 175,831 tons to 112,849 tons; and Chile had a drop from 194,221 tons to 130,866 tons.

The member countries of the Fish Meal Exporters Organization - Peru, Norway, South and South West Africa, Chile, Iceland and Angola - reported a 24 per cent rise in export during 1967. FEO countries shipped 2.6 million tons in 1967, compared with 2.1 million tons in 1966 (Fishing News International 7;1968;18).

J3
POD
SE. 17. 1968

Triphenyltin hydroxide is recommended as a preventative of potato blight (*Phytophthora infestans*) in a new publication "Early Warning Manual for Diseases and Pests of Potatoes".

This book provides the grower with a rapid means of identifying what one hopes must be most of the pests and diseases to which potatoes are commonly subject. Every pathological condition, whether due to disease or pest, is clearly and delicately indicated by softly graduating photographic reproductions, mostly in plain black and white but where necessary ~~in~~ in colour, to show foliage and flesh tints of potatoes.

The text to the pictures is programmed and extremely brief. It is usually in the form of questions and answers of five or ten words each. These are separately boxed so as to give them distinctness and an arrow points to the appropriate next item of information. Sections relate to diseases which appear at "80% plant emergence", at full foliage, at the Beaumont period (July, usually, in South West England and Wales), at harvesting, and consequent upon storage by various methods. The main factors affecting the development of pests and diseases are tabulated into susceptible varieties, areas, soils, and weather conditions.

Among the diseases listed and illustrated are watery wound spot, rugose mosaic, blight, silver scurf, common scab, powdery scab, warts, leaf roll and gangrene, and, if these are not enough, there is a horrifying list of pests including worms (Cut, eel- and wire-), earwigs, aphids, slugs, capsid bugs, chafer beetles, flea beetles, leaf hoppers, millipedes and ground fleas. Not all of these pests and diseases can be countered by disinfectants and pesticides, but against potato blight this Manual recommends spraying as early as possible with any one of three chemicals one of which is described as "Fentin hydroxide", the handy word recommended by the International Standards Organisation for "triphenyltin hydroxide". (Tin and Its Uses No.77;1968;15).

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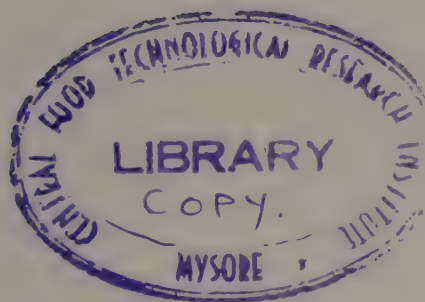
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F39R91,ZQL;91;eF6 Cottonseed,
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F3ZG51,ZEO(D9c) Tea, Bottled

PART IV. Periodicals-Title Service

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X8(F3Zb) Dairy Industry
X8(F3Z5Z) Fish Industry
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PART III. Technical News Brief

R3,ZFP Food, Irradiated IRRADIATED FOOD

X-Ray irradiation as a substitute for more conventional sterilization was pioneered at M.I.T. nearly 10 years ago. Now it is clear that in the case of many foodstuffs irradiated products "offer a good potential for improving public health" by reducing microbiological hazards, Samuel A. Goldblith, '40, Professor of Food Science, and three M.I.T. colleagues told the Japanese Conference on Radioisotopes in Tokyo early in the winter.

It is now proved feasible, they said to preserve strawberries, bananas, and citrus fruits; indeed, strawberries treated with relatively low doses of ionizing energy have longer shelf life than untreated strawberries when refrigerated at temperatures even above freezing. There is promise of similar success with peaches, nectarines, and tomatoes. Research has demonstrated the feasibility of radiation preservation of shrimp, crab, clams, haddock, and cod. Though work remains to be done, the "probability of success seems high" in the radiation treatment of poultry and eggs to eliminate salmonellae contamination, which now affects between 10 and 30 per cent of market poultry in the U.S. If successful in final tests, the method can probably be extended to the treatment of such animal feeds as fish and bone meal.

To ~~xxx~~ the suggestion that radiation-resistant mutants may result from wide application of the process, the M.I.T. workers report from their experiments "that it was so difficult to produce resistant mutants under wellcontrolled conditions in the laboratory that the probability of producing meaningful numbers in practice is very small indeed". [Technology Review 70;1968;59].

F39R1:a7,T15 Tomato, Peeling METHODS OF PEELING TOMATO

Fresh tomatoes can be devoured whole, skin and all, but this, of course, is not good enough for the canning industry or for the fastidious housewife making her own soups, juices and relishes. The tomato's skin, though thin, is extremely adhesive, and its removal poses quite a scientific problem.

There are various ways of skinning a tomato: one way is to rub the surface with the back of a knife and then to scalp it; another method is to immerse the tomatoes in boiling water, drain them and skin them; a third method is to place the tomato on a fork and heat it until the skin cracks.

All these techniques have the disadvantages of taking time and of being cruel to the tomato which retaliates by not coming up to the standards set by the United States Institute of Standards for the grading of canned tomatoes.

Scientists of Israel's Volcani Institute for Agricultural Research Department of Food Storage and Technology, B. Juven, Z. Samish, K. Ludin and S. Zahavi, have taken the tomato in hand, and have

tested various methods of peeling it, while maintaining the natural colour and firmness of the fruit required by industry.

They have compared such methods as steaming the tomatoes and then peeling them; dipping them into an 18 per cent cold lye solution (NaOH) followed by steaming or immersing in hot water; or dipping them into hot lye solution.

The efficiency of the lye peeling was found to depend on the concentration and the temperature of the lye solution, on the time of dipping and on whether the fruit was ripe or not. Results showed that the best method was dipping in hot lye (90-95°C) for 20-25 seconds. This provided the easiest way of peeling, as well as the highest quality of peeled tomato and the minimal peeling losses.

When 0.2 per cent detergent was added to the lye, this improved the peeling process significantly, reducing peeling losses by more than 40 per cent without affecting the natural colour and firmness of the fruit. The efficiency of the detergents tested in the lye peeling was not proportional to their effect on the surface tension of the NaOH solution. [Food Industries Journal 2(2);1968;17].

F39R91,ZQL;91;eF6 Cottonseed, Flour, Protein, Edible HIGH-PROTEIN EDIBLE FLOUR FROM COTTONSEED

United States scientists have developed a process to produce a high-protein edible flour from cottonseed. This flour is already enriching wheat flour breads, biscuits and other foods in America.

In less developed countries that grow large quantities of cotton, the new flour could vastly increase the amount of protein available to people suffering from undernourishment or malnutrition.

Experiments indicate that each 100 tons of cottonseed should yield about 36,000 pounds (16,200 kilograms) of high-quality edible flour containing 65 per cent protein.

It is said the United States could annually produce two million tons of such flour, while other cotton growing countries could produce six million additional tons.

The flour making process called LCP, or liquid cyclone process involves the mechanical separation into two fractions of specially ground, oil free cottonseed kernels.

The larger fraction contains about 65 per cent, protein. When finely ground into flour, it has a bland flavour and a light creamy colour.

The smaller fraction, containing virtually all the pigment glands and fibre, would be used as animal feed.

[Food Industries Journal 2(2);1968;20].

F3ZG51,ZEO(D9c) Tea, Bottled
BOTTLED TEA: CEYLON EXPERIMENT

The Ceylon Institute of Scientific and Industrial Research is trying to develop a type of tea which could be bottled.

The CISIR began its experiments after the Ceylon Tea Propaganda Board suggested that it try to develop a tea which could compare with other bottled non-alcoholic beverages like Coca cola.

The board believes that if the experiments are successful, Ceylon could attract tea drinkers from among the younger generation who want a quick drink and are not keen on preparing tea in a pot, the traditional method which takes at least five minutes.

The CISIR experiments are designed to find an additive which will make the infusion of tea keep for a length of time without going "flat". [Food Industries Journal 2(2);1968;19].

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CENTRAL FOOD TECHNOLOGICAL
RESEARCH INSTITUTE
MYSORE

LIBRARY BULLETIN



Vol. 7

No. 8

AUGUST 1968

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PART III. TECHNICAL NEWS BRIEF

F3:xP,E Food, Preservation, Packaging THE ASEPTIC PACKAGING OF FOODSTUFFS PRODUCTS.

The article, by Dr. Walter Betz of BASF, deals with the techniques available for aseptic filling and sealing of packages of various types. In particular, the article deals with the Tetra Pak system for aseptic filling and the possibilities which are created by the use of plastics materials for the production of the container and its filling and sealing to be parts of one continuous sequence of operations. The current developments in the 'Long Life Milk' market, based upon the ultra-high temperature sterilisation technique, have proven the acceptability of the product. The use of hydrogen peroxide for package-forming operation forms part of the Tetra Pak system. When the package is produced from a thermoplastics material, i.e. as in blow-moulding, the heat of extrusion suffices to ensure the sterility of the container and if the filling operation immediately follows within a sterile area the asepsis of the procedure is ensured without resort to chemical treatment or to radiation techniques. (Packaging 38;1967;82.)

F3:xP,E0(D4) Food, Preservation, Packaged (in) Paper SUITABILITY OF COATED PAPERS FOR FOODSTUFFS PACKAGING

Presented in tabular form for ready reference, this issue comprises a summary of the report prepared by the 'Paper and Plastics-coated papers' working-group of the Institute of Food Technology and Packaging, Munich. The table includes all types of fresh produce as well as dairy products, cereals meats and meat products, biscuits and other bakery goods, chocolate and sugar confectionery, fruit, syrups, etc., in relation to polyethylene and PVDC-coated papers and boards. (Packaging 38;1967;82.)

F39H:xP,E Fruit, Preservation, Packaging SHOW PACKAGING FOR FRESH FRUIT

A new package, designed especially for fresh fruit grown in Ontario, has been developed by the Corrugated Container Division of Continental Can Company of Canada Limited. It is being used with this year's crop.

The container, 19" x 7" x 9-1/2", has four thicknesses of corrugated board at each end and a double bottom. This gives it exceptional stacking strength for palletizing 8 high in trucks or railway express cars.

The container is formed and closed by a locking system rather than by staples or glue; this system adds another double thickness of board to the front panel of the box when it is closed for shipment.

The absence of staples or glue allowed the designers to build in a simple arrangement for converting the box into a display container. For this purpose the top and front panels fold inward and are locked into slots between the back panels and the ends. (Canad Food Indus 39;1968;46).

F39Z3:xP,E0(D9f) Ketchup, Preservation, Packaged (in) Carton
KETCHUP IN MILK CARTONS?

The Marriott Hot Shoppe chain of restaurants has adopted the Pure Pak polyethylene-coated milk cartons for soups, gravy, chilli, syrup, salad_dressings and sauerkraut. The cartons replace the one gallon stainless-steel containers formerly **used and meet the standards** established by Departments of Health. They obviate the need for the cleansing of **returnables** and the standard design is printed in four different colours each week the colour changes and stock rotation is simplified. The form-fill-seal machine used is the 'Pure-Pak Model UP-1 and the fillers are built by G. Diehl Mateer Co, to fill at about eight gallons per minute. (Packaging 38;1967;84).

F3ZC,ZF4,ZE0(D9f) Milk, Dried, Packaged (in) Carton
DRIED MILK IN CARTONS

HERMETET lined cartons made by the Metal Box Co. Ltd., 37 Baker Street, London W-1, have been adopted by Cadbury Brothers Ltd. for their Marvel instant milk in the London area. The cartons have a filled weight of 1 lb. and are made from coated grey back board and lined with a laminate of glazed imitation parchment, aluminium foil and polyethylene. The top has an easy-open device and reclosure lock. They are formed on Metal Box Box's Hermis 2 machines, and printed in six colour litho with a surface design that goes round three sides of the carton.

The cartons, which will run concurrently with the tinplate lever lid containers already in use by Cadbury and also made by Metal Box, were chosen because they are cheaper and can be more easily printed. This enables Cadbury to sell their cartoned milk at a recommended price of 6d a pint. Price of a liquid milk, a departure from the previous marketing campaign which advertised it for dry use. Cadbury, who hope to expand the use of dried milk for cooking and as a beverage, say this was one of the main considerations in choosing the more printable carton.

Disadvantage of milk in a carton is that, while it will keep for months as long as it is sealed, Cadbury advise, consumption within three weeks once it has been opened to prevent loss of flavour. Tins are almost indefinitely resealable. (Packaging Rev 87;1967;22).

F3Zj,ZE0(D6) Butter, Packaged (in) Plastics
PLASTICS PACKS FOR BUTTER

A special grade of PVC has been developed by an Italian company for the production of thermoformed packs for butter. Styled Alfapack anti-UV, this material is claimed to be impermeable to ultra-violet actinic radiation in the range of 400 millimicrons wavelengths. Thus it can effectively be used for the production of butter-packs, without risk of oxidation or rancidification of the contents even when displayed in refrigerated cabinet under fluorescent lighting. Other products such as margarine and cooking fats can utilise this new grade, which is ideal for 'form-fill-seal' thermoforming machines. (Packaging 38;1967;82).

F3Z8,ZE Egg, Packaged DEVELOPMENTS IN EGG-PACKS

A feature-article in this issue is concerned with world-wide developments in the retail packaging of eggs. The article, which is illustrated by photographs and diagrams showing the constructional principles, is extremely comprehensive, including even examples of Caribion elasticised paper packs as used for eggs, as well as the conventional moulded pulp, paperboard and thermoformed plastics packs. (Packaging 39;1968;95).

M98

HOT-MELT KNOWHOW FOR CONVERTED PRODUCTS

Because of the growing use of hot-melts as adhesives for cartons and bags, it is necessary for the converter to understand the characteristics and the performance to be expected from the various possible formulations. Since hot-melts are applied at relatively elevated temperatures, they will penetrate substrates which cold-applied adhesives cannot: even though the cold adhesives be embodied in a solvent, if the solvent cannot prepenetrate the surface of the substrate the adhesive will not dry out and will result in an ineffective bond.

This feature article gives a tabular résumé of the different formulations required for porous and for non-porous substrates and also lists the types of products for which they are applicable and the nature of the bonding problem which they can overcome.

The problems arising from the use of hot-melts both in the pre-applied form and in the point-of-use applications are dealt with at length in this article and the various types of applicators (guns, wheels, etc.) are described. (Packaging 38;1967;84).

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E9G,92Z2:4 Protein Synthesis

E9G,92Z2J Vegetable Protein

E9G,92Z2K Animal Protein

E9G,94 Fat and Fatty acids

E9G,972 Vitamin B

E9G,972:3C5T Vitamin B Thin Layer
Chromatographic analysis

E9G,973 Vitamin C

E9G,982 Enzyme

E9G,986 Hormone

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F:7 Fermentation Technology

F1 Chemical Technology

F1:821 Freeze drying

F1:(D) Chemical Engineering

F145 Tin plate Technology

F94

F94:81

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I:(E982)

I:(E9G)

I21

I21:(E9G) Yeast, Biochemistry

J

J:4:634 Pesticide

J:4386:634 Insecticide

J:(E)

J3512 Agricultural Chemistry

J3512 Spinach

J3512:(E9G) Spinach, Biochemistry

J3513 Cabbage

J37 Fruits

J371 Apple

J371:4 Apple Disease

J3721 Orange

J3752 Pineapple

J3754 Guava

J37943 Tomato

J37943:93 Tomato Physiology

J37971 Papain

J38 Cereal

J382 Wheat

J382:(E9G) Wheat, Biochemistry

J383 Oat

J383:(E9G) Oat, Biochemistry

J581 Groundnut

J581:93 Groundnut, Physiology

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K86 Insecta

K86,12 Insecta, Tissue

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KX332 Fish

KX35 Poultry

KX351 Fowl

KX351:1 Fowl, Nutrition

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L:4 Disease

L:461 Nutritional deficiency

L:5 Public Health and Hygiene

L:573 Nutrition

L:5730 Dietetics

L293 Pancreas

L293:46 Diabetes

L9C CHILD

L9C:573 Child, Nutrition

M USEFUL ARTS

X ECONOMICS

X8(F3) Food Industry

X8(F3Zb) Dairy Industry

X8(F3Z5T) Seafood Industry

X8(F3Z5Z) Fish Industry

X8(F39H) Fruit Industry

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PART III. TECHNICAL NEWS BRIEF.

F3;9A Food, Additive FOOD ADDITIVES

British Standard 4307-Calcium propionate and sodium propionate for use in foodstuffs (Metric Units) is one of a series concerning chemicals used for food preservation, the preparation of which has been authorised by the Chemical Industry Standards Committee.

The Standard gives requirements for water content, matter insoluble in water, pH value, readily oxidisable substances, iron, arsenic, lead and propionate content. Appendices outline the relevant methods of test.

Copies of BS 4307 may be obtained from the BSI Sales Office, Price 6s each. [Food Tr Rev 38;1968;84].

F3;S6 Food, Pesticide residue PESTICIDES RESIDUE IN FOOD-NO CAUSE FOR ALARM

There is no cause for alarm that harmful amounts of pesticides are contaminating the country's food according to the first year's results, of a two year survey being carried out by over 200 local authorities in conjunction with the association of the Public Analysts.

In their report published this week, the association warns, however, against complacency. The results of two years' survey should indicate those fields to which particular attention should be paid and this should be the pattern for future work, always bearing in mind that the pattern may change with new applications or new pesticides, the report states.

In the survey, some 2,500 samples of staple foodstuffs were admitted to detailed analysis. [Chemical age 98;1968;15].

F31 Rice BATINA SEED

Recently, at the University of Michigan, Lloyd E. Brownell developed a substitute and called it Batina seed. The new product is, perhaps, the first that could be a successful substitute for rice in typical recipes. A well-balanced food, Batina seed's major components include cereal flours, toasted soy flours, vitamin and mineral supplements.

With such efforts to increase or supplement the world rice supply, it remained for private industry to tap another rice source--the ingredients inherent in the rice grain itself.

From Riviana Foods Company, a leading miller of rice, came the recent announcement that a new milling process had been developed, which yields a sweet rice bran and a rice oil in addition to the rice itself. Rice bran, a protein-rich component, has generally been discarded in traditional milling methods. The new technique may signal a time when the world will get more out of rice. [Industrial Week 1;1968;16].

F39L3 -Cherry

FIRMNESS OF CHERRIES A QUALITY FACTOR

Color, flavor and firmness tell the quality of cherries. Ways have been devised to determine color and flavor, but a good method to measure firmness has yet to be found.

Food processing specialist Joachim von Elbe of the University of Wisconsin is currently developing such a method. With the help of agricultural engineers, he has designed an instrument which measures with precision the force needed to pit a cherry.

Vol Elbe has charted the force used by the instrument in pitting cherries and found that three force concentrations or peaks occur in the operation. The first peak registers as the pitting needle pierces the skin and flesh toward the seed. The second and highest peak results from the force used to detach the pit from the surrounding flesh. The third peak reflects the force needed to push the pit through the flesh and out of the skin.

Vol Elbe says he will redesign the device so it would measure only the skin and flesh firmness of cherries. When the instrument is fully developed, it could be valuable to the cherry canning industry. Canning plants could be equipped with the device to achieve quality control for firmness. [Canning Trade 90;1968;20].

F3Z5Z Fish Technology

A PORTABLE MACHINE TO SKIN FISH

It is reported that a portable machine designed to skin almost any size of fish up to 9 inches wide and any length has been put on the market by a US firm and is offered for \$ 4,750. It is being described as a simple and economical machine designed to meet the needs of the small medium sized producer. The machine can skin sharks also.

The machine is run by a 1-1/2 horsepower motor and needs 220-Volt electricity and a 1/2 inch water supply. [Indian Seafoods 5;1967;22].

F3Z6M2 Shrimp

INDIA INTRODUCES BACTERIOLOGICAL STANDARDS FOR SHRIMP EXPORTS

By a notification issued by the Government of India, exports of Frozen Prawns (Shrimp) cooked type and Prawns (Shrimp) canned in brine and dry packed will be subject to bacteriological inspection with effect from the 15th January 1968. The microbiological requirements prescribed to quality frozen prawns (shrimp) cooked type for export are as under:

(i) Total Plate count at 37°C per gram Maximum	200,000
(ii) E-Coli count per gram Maximum	20
(iii) Coagulase positive staphylococcus count per gram, Maximum	100
(iv) Salmonella and other pathogenic bacteria	Nil

A proposal for reducing the plate count from 2 lakhs to 1 lakh is under consideration of the Government. In respect of Prawns, standard prescribed is as under:-

The contents of the can shall not show growth in thioglycollate-cystine broth at 37°C. The cans on opening shall not give any odour indicative of bacterial spoilage, shall not show liquefaction of contents and shall not show blackening of either the can or the contents. The can shall not show flipper or swelling.

Introduction of bacteriological standards for other varieties of seafoods exported from India is under the active consideration of the Marine Products Export Promotion Council in consultation with the concerned authorities. [Indian Seafoods 5;1968;19].

KX332

WORLD PRAWN CATCH DOUBLED SINCE 1938

The world catch of prawns and shrimps nearly doubled between 1938 and 1965, according to a recent publication of the food and agriculture organisation. Its bulletin of Fishery Statistics for Crustaceans reveals that the prawn and shrimp catch rose to 641,000 metric tons from 335,000.

Significant gains were made by developing countries who are finding hard-currency markets for shrimps and prawns. India exported nearly \$US 10 million worth of shrimps and prawns in 1965 compared with \$US 3.6 million worth of shrimps in 1958. In three years, Pakistan more than quadrupled its shrimp and lobster exports (which rose from \$US 1.5 million in 1962 to \$US 4.93 million in 1965).

Figures for Venezuela show \$US 3.4 million in exports in 1965 against \$US 8,000 in 1958. [Indian Seafoods 5;1967;22].

TOTAL CATCH (LIVE WEIGHT) OF FISH, CRUSTACEANS, AND MOLLUSCS IN SELECTED COUNTRIES

	(1000 Metric tons)			
	1966	1965	1964	1963
World total	56,000.0	52,600.0	52,000.0	47,600.0
Peru	8,800.1	7,461.9	9,116.5	6,899.0
Japan	7,070.0	6,907.7	6,350.7	6,698.5
China (Mainland) 2/	5,800.0	5,800.0	5,800.0	5,800.0
USSR	5,348.8	5,099.9	4,475.8	3,977.2
Norway	2,849.4	2,307.3	1,608.1	1,387.9
United States	2,514.6	2,724.3	2,647.1	2,777.0
South Africa & S.-W,	1,400.0	1,342.4	1,254.5	1,170.8
Africa Chile	1,383.5	708.5	1,160.9	761.9
India	1,367.4	1,331.3	1,320.0	1,046.3
Spain	1,356.4	1,338.5	1,203.5	1,125.3
Canada	1,348.0	1,262.1	1,211.0	1,197.6
Iceland	1,238.4	1,199.0	972.7	784.5
United Kingdom	1,067.9	1,046.8	974.3	960.9

[Seafood Trade Journal 3;1968;42].

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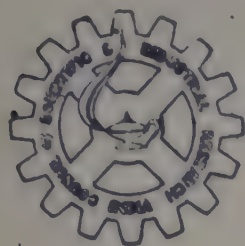
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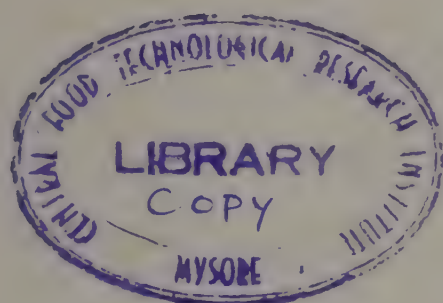
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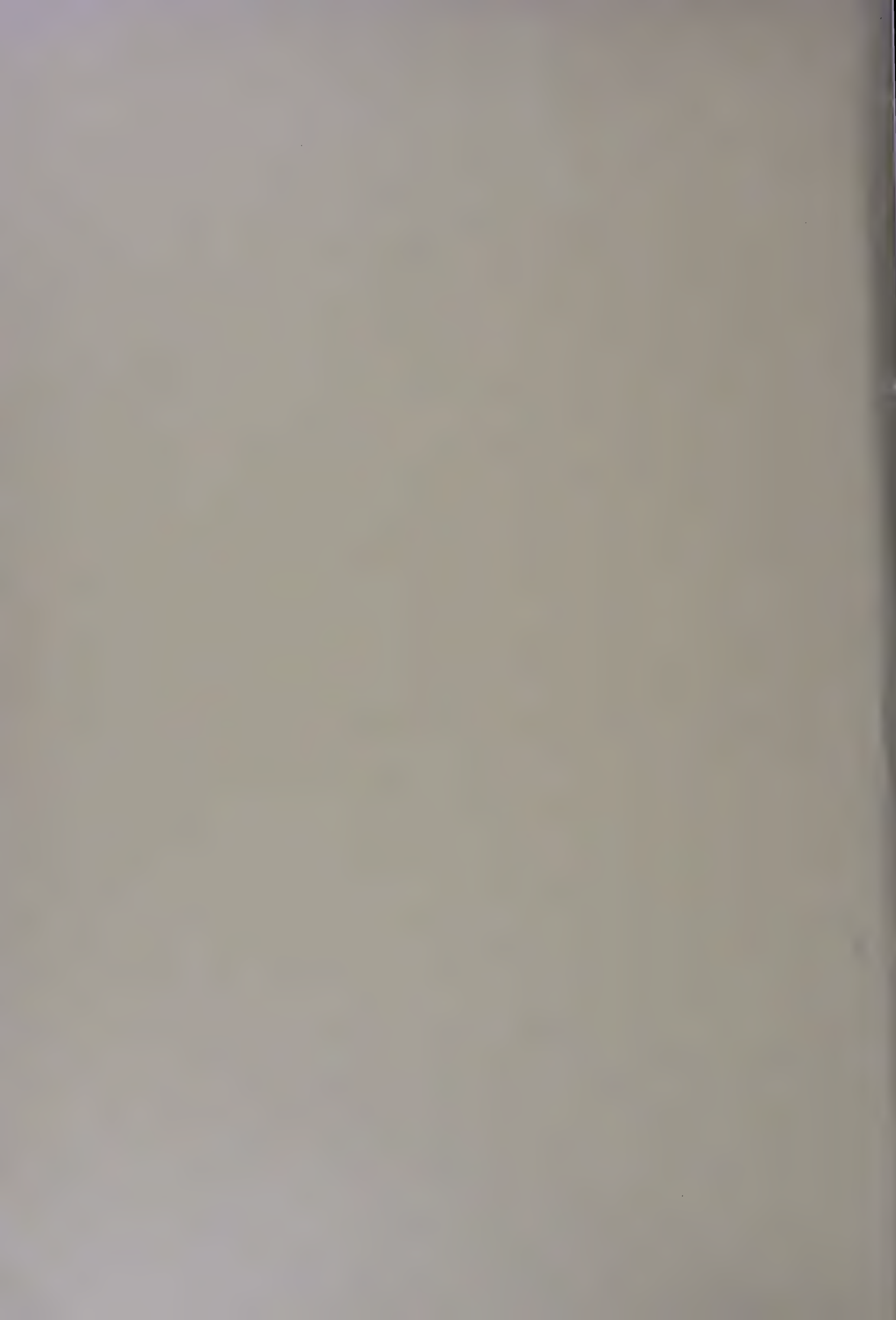
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PART III. TECHNICAL NEWS BRIEF

D6,8(MC421) Cold Stores MEASURING HUMIDITY IN COLD STORES

Continuing its work on the development of humidity sensors, Torry hopes that it may be possible to use these in cold stores and also sealed into packs of frozen fish so as to study the effect of fluctuating temperature on the loss of water from fish inside and impervious wrapping. Torry says that even under mildly fluctuating temperatures several per cent of the weight of a wrapped product can be lost within a few weeks as ice forming on the inside of the wrapper. [Food Manuf 43;1968;36].

F3:xP,FP Food, Irradiated DUTCH EXPERIMENTS WITH IRRADIATED FOOD

Although no country is very keen to give a formal blessing to irradiated foodstuffs (see New Scientist Vol.38, p. 476) the results of experiments on fruit and vegetables reported by the Netherlands Institute for the Application of Nuclear Energy in Agriculture (ITAL) sound promising.

For instance, potatoes which can no longer be mechanically peeled after five months in store were found, after irradiation to be still "peelable" after seven months. Scientists reported that using 10 kilorad gamma rays completely suppressed sprouting during that period. Losses through hand-peeling after a shelf life of three months, normally around 70 per cent, were cut to 25 per cent.

Packaged mushrooms, treated with 1.5 MeV electron beams (250 kilorads) stayed fresh for three or four days but much depends on the state of ripeness at the time of irradiation. It was found that storing at 20° speeds the ripening process so that it cannot then be halted by irradiation, so that the treatment should be applied immediately after harvesting. Strawberries, too, can have their shelf life extended but this depends on a number of factors including avoidance of excess doses of nitrogenous manure in the spring.

Irradiation treatment also shortens cooking times of many types of air-dried vegetables including onions, cauliflower, celery, spinach, some kinds of cabbage, potato slices, and green peas. Soup made from a mixture of treated vegetables cooked in eight minutes compared with 20 minutes for untreated vegetables. In the case of dried vegetables it is assumed that irradiation speeds up water absorption by breaking down polymeric substances in cell walls.

Besides the Netherlands' work on vegetables, there is a project in Iceland this summer to demonstrate the value of irradiation in preserving fish. A unit designed and provided by the US Atomic Energy Commission will be used. It has been designed for use on board ship, the idea being to enable trawlers to extend their fishing trips. This summer's experimental programme will be carried out in government laboratories at Reykjavik. [New Scientist 39;1968;64].

F3:xP,FP Food, Irradiation

IRRADIATION OF FOODS

There is an attempt to sterilise horse meat for dogs against salmonella infections and research workers at the Wantage Atomic Energy Research Establishment have gone on record as expressing confidence in the safety of such treatment.

Feeding trials are now going forward using rats and mice, but we wonder in passing, have any attempts, been made to assess the effects of irradiation on the germ of wheat, distilling and animal feeding. These must be the ultimate test of grain irradiation just as product flavour has been in the irradiation of cakes to lengthen shelf life. [Milling 150;1968;13].

F3:91 Food, Protein

AMERICAN FIRM TO DEVELOP PROTEIN FOOD IN INDIA

Two U.S. firms will develop and test market low-cost high-protein food and drink products in India and Pakistan.

The agency for International Development (AID) announced in Washington on July 26 that it had signed contracts with the firms for the project whose primary objective is to test such products for use as supplements to basic diets.

The foods and beverages to be developed must be from local food sources. Preliminary testing of commercial feasibility will also be undertaken after the products are developed.

One firm, the Commercial Research Foundation, will work in India with an A.I.D. grant of \$ 41,325 (Rs. 3,09,937) plus the equivalent of \$ 18,924 (Rs. 1,41,930) in U.S. held local currency. The other firm, General Mills, will seek to develop a product in Pakistan, with a grant of \$ 26,000 plus the equivalent of \$ 30,000 in local currency. (Food Industries Journal 2;1968;16).

F39Q1 Banana

VIBRATING A BANANA TO SEE WHEN IT RIPENS

When a housewife buys bananas she judges the quality of the fruit by the colour of the peel. This is assumed to indicate both flavour and texture. Growers, when they need a more objective test, can measure the firmness of the fruit by recording the resistance it offers to a "mechanical thumb". A second alternative is now open to them. E.E. Finney of the Agricultural Research Service, US Department of Agriculture claims that the firmness of bananas (or that of any other fruit or vegetable) can be measured by subjecting the fruit to sonic vibrations and then determining its young's modulus (Journal of Food Science Vol.32, p. 642). Young's modulus (which is defined as the ratio of stress to strain) provides a convenient measure of firmness and can be calculated (from a simple formula) once the resonant frequency of the banana is known. The resonant frequency occurs when the amplitude of vibrations of the banana is at a maximum.

Tabular portions of banana are suspended in the horizontal place by lightweight cords and bombarded with sound vibrations from a loud-speaker close to one end. The frequency of the sound is varied and the

the banana's amplitude of vibration varies in sympathy. The latter is recorded at the far end by a stylus which just touches the surface and is connected through linkages to a chart recorder. The maximum amplitude is easily observed and the resonant frequency can be read off from the chart.

Finney claims that his experiments show that Young's modulus decreases as bananas ripen. He reports good correlation between his results and those for changing sugar content and colour of peel, and recommends the technique for determining the ripeness not only of bananas but also of other fruits and vegetables. [New Scientist 39;1968;339].

F39Q2 Mango MANGO PRODUCTS IN DEMAND IN RUSSIA

The Indian mango has become increasingly popular in Russia, it is learnt.

According to a leading manufacturer of canned products at Bamrauli, near Allahabad, Russians have succumbed to the taste and flavour of the Indian mango, and its export has nearly doubled since last year.

The Bamrauli firm is executing an order of 1,200 tonnes of mango juice worth Rs. 22 lakhs this year. [The Food Industries Journal 2;1968;4].

F39Z5 Curry Powder QUALITY CONTROL OF CURRY POWDERS

The government of India's scheme for quality control of curry powders was discussed at a meeting of exporters of curry powders in Madras on July 18, Mr. B.D. Joshi, Agricultural Marketing Adviser to the Government of India, the Deputy Agricultural Marketing Adviser, Mr. R.N. Chaturvedi and the Senior Marketing Officer for the Southern Region, Mr. M.B. Nayar, besides the Chairman of the Spices Export Promotion Council, the Deputy Director of Export promotion in the Ministry of Commerce and the Manager of the Export Inspection Council in Madras took part in the discussions.

After discussing the procedural steps connected with the quality control scheme, the meeting decided to bring the scheme into operation before the end of this year. The exporters offered their full cooperation in its implementation.

India exported annually 1,500 tons of curry powders valued at Rs. 50 lakhs. More than 70 per cent of the total export is from Madras. [Food Industries Journal 2;1968;17].

F3Z5Z Fish DANGER POINTS IN FISH PROCESSING

Bacteria responsible for the spoilage of fish during handling and processing is constantly under investigation. Health hazards that are existing in the handling and consumption of fish and in particular how these are influenced by new processing methods such as vacuum packaging and irradiation are being studied.

Demonstrations with diagrams of a frozen fried fish stick production line and a fishmeal production lineshowed the danger points at which bacteria could gain access. In the case of the former, these included the preparation of the batter and the covering of the fish with batter and emphasis was placed on the dangers of not paying sufficient attention to hygiene at these points.

Due to its high carbohydrate content, batter is a perfect medium for the growth of bacteria, it was pointed out, and thorough cleaning of all equipment in contact with batter is essential. Preliminary cleaning should be followed by sterilisation and all traces of old batter must be removed from equipment and vessels.

In fishmeal production, inadequate drying can lead to a final product with a high moisture content and give rise to bacterial growth. [Food Manufacture 43;1968;36).

F3Z5Z:xP,E Fish, Packaging PREPACKAGING FRESH FISH

High priority is being given to methods of prepackaging fresh fish for sale in supermarkets following market trials conducted in conjunction with the white fish authority which showed that there was a considerable potential for the product. At present best quality fillets of cod haddock and plaice and smoked haddock are packed either in trays which are overwrapped or in vacuum pouches.

Torry has evolved a "code of practice" to meet the specific requirements of this form of preparation and marketing. This lays down quality of the fish, the preparation of the packs and the handling of the product at the point of sale. Much work has been done on the type of packaging materials to produce those that will extend the shelf life of the product.

Torry warns that the practice of some producers of freezing the packs is false economy and, in fact, only results in a lower quality product. One of the latest experiments is the breading of fish for sale in prepackaged form. At the time of the open days there was no specific result to report as the experiment is continuing. [Food Manufacture 43;1968;35].

F3Z5Z:xP,FC Fish, Freezing PROTAN METHOD OF FREEZING FISH

The object of the Protan method, i.e. block freezing of fish and fish products in alginate jelly, is to prevent rancidity and drying out in the frozen product during long-term storage. (A new type-jelly does not require special proportioning apparatus. All that is needed is a large tank with a mechanical mixer for dissolving the powder). This protection is achieved by surrounding the frozen product with a coating or film of alginate jelly thus excluding the air which is the cause of deterioration in the quality of products during storage at normal temperatures.

The basic principle of the method is that fresh fish or fillets are dipped or put into a solution of Frostgel powder and thereafter packed in lined frames or in the packaging in which the product is to be frozen. During freezing the solution will become jelly-like and finally go over to an icehard mass which is practically impenetrable to

to air. During thawing the jelly returns to a thick liquid which is easily washed off with water.

Freezing of fish or fillets in Protan jelly must take place in plate freezers or tunnel freezers so equipped as to permit the freezing of blocks under pressure. If freezing is not done under pressure, the fish will be forced up from the jelly during freezing and lie at the surface of the blocks without protection.

This Norwegian process is used in freezing round herring, blocks and glazing of various types of fishery products. [Food Industries Journal 2;1968;15].

F3Z5Z:xP,FC Fish, Freezing
LOW TEMPERATURE PHYSIOLOGY

Investigations are being made into the effects of freezing on muscle tissue so as to determine the best conditions for the freezing and cold storage of fish. Most of the deterioration in stored white fish takes place in the protein fraction, and this can now be determined by the cell fragility technique developed at Torry. Apparatus for doing this has now been developed for commercial use and became available last year.

Commercially frozen fish sometimes "gape" or fall to pieces after thawing out. This has led to a study, Currently underway, of how a fillet is held together. [Food Manufacture 43;1968;35].

F3Z5Z:xP,FE Fish, Freeze-drying
FREEZE-DRYING OF FISH AND FISHERY PRODUCTS

Successful trials have been made by the Central Institute of Fisheries Technology in Cochin of a process of freeze-drying fish, shell fish and fishery products.

It has produced a high-calorie and high-protein "fish salad" according to the Director of the Institute, Dr. AnN. Bose.

He said that freeze-dried fishery products were of much use for defence forces in action or while posted in far-off mountainous or forest regions.

In the freeze-drying process, there is no shrinkage of the food article as in other methods of dehydration, and it retains its original shape and size.

Indian sugar first entered the world market in 1957 when it earned Rs. 118,000,000 in foreign exchange. In 1963, these earnings had risen to Rs. 323,000,000 but they went down to Rs. 179,000,000 in 1966.

Of late exports have suffered because of the shortfall in production and their uncompetitive price in foreign markets.

India's customers include Malaysia, South Vietnam, Hong Kong, South Korea, Iran, Iraq, Lebanon, Zambia, France, Italy, Britain, Canada and the United States [Food Industries Journal 2;1968;4].

F3Z5Z;C Fish, Physical property PHYSICAL INVESTIGATIONS

Physical investigations of freezing, thawing, drying and heat processing of fish are in progress. Among equipment being used is a new type of precision electronic balance and data logger for obtaining large numbers of experimental results and processing them in a form ready for analysis by digital computer. The equipment is currently being used for investigations into the effect of polyphosphate dips on drip loss and for the study of air drying. [Food Manufacture 43;1968;35].

F3Z5Z;eF31 Fish, Flavour IMPROVING FISH FLAVOUR

Flavour characteristics of different species of fish arise mainly from differences in the volatile compounds present. In Terry's flavour chemistry laboratory work has been concerned with attempts to analyse and identify the volatile components responsible for the characteristic flavours of lemon sole and plaice. Methods of removing volatiles comprise distillation extraction, concentration, zone refining and finally analysis of volatile materials by gas chromatography.

The ultimate aim is said to be upgrade the cheaper and less familiar kinds of fish but it is not clear how the system is to be applied in practice. Presumably what is in mind is to transfer by some means the volatile compounds from high quality fish to fish which is less acceptable. [Food Manufacture 43;1968;36].

F3Z6M3,ZFC Prawn, Frozen PREVENTION OF THAW DRIP LOSS IN FROZEN PRAWNS

When frozen prawns are thawed, there is a certain amount of weight loss due to "drip" as is the case with frozen fish product in general.

"Drip" is the non-reabsorbable liquid released from the frozen material during thawing. It will contain dissolved nitrogenous constituents and delicate flavour-bearing components of the fish. Thus, apart from causing weight loss, the phenomenon of drip brings about loss of nutrients and also change in texture which are undesirable.

The percentage of drip may vary with the species of the prawns or fish, size, preprocess storage conditions, temperature of freezing, freezing time, temperature of storage after freezing, duration of frozen storage, etc. Weight loss due to drip is nearly 10% in peeled and deveined frozen prawns, 5% in headless frozen variety and 3% in cooked frozen prawns.

In the case of frozen prawns for export, to compensate for the loss in weight after thawing at the receiving end, the present practice followed by the industry is to put an additional quantity of prawns every frozen block [5 lbs]. Generally, 412 oz. of extra prawns are added per block depending on the size grade. It is roughly estimated that because of this extra quantity added, the industry loses about 10% by weight of the total quantity of prawns exported. Considering the present volume of export of frozen prawns from India, this amounts to 100 tons of prawns per year for which no price is realised. A

CIFT EVOLVES METHOD

The central Institute of Fisheries Technology has been carrying out investigations on different aspects of this problem of "drip". A simple method which may be very effective has been evolved by the Institute and is on extensive field trials.

The method consists in dipping the prawns in a solution of a mixture of 12% sodium tripolyphosphate and 8.6% sodium dihydrogen phosphate for one minute before weighing the material for freezing or after. The frozen blocks can be glazed in the usual manner.

Different phosphates were tried in the experiments for treating the raw material since the compounds have the property of increasing the water-binding capacity of protein. Of the several individual and mixtures of phosphates tried, sodium tripolyphosphate was found to be the most effective for treating the prawns. In order to get the best result it was found that the pH of the dip solution should be kept at or about 7. Sodium dihydrogen phosphate or citric acid at appropriate levels could be advantageously used for maintaining the required level of acidity of the dip solution. Alkaline phosphate solution was not found suitable since the prawns lost their characteristic colour on cooking.

SIGNIFICANT REDUCTION

By adopting the method of treatment as suggested here, the loss in drip in frozen prawn can be significantly reduced. The treatment has the added effect of increasing the yield on cooking the material which is beneficial in the processing of cooked frozen prawns. A cooked yield of 62-65% is obtained whereas in the case of untreated sample the yield is only 50-55% as can be seen from the table below. The total protein content is also maintained in the treated samples.

Effect of the treatment on the yield on cooking

	Control sample	Sample treated with the phosphate mixture
Cooked yield	50-55%	62-65%
Total protein (based on 100 gm. raw material)	5.3-5.9	5.9-6.17
Ash (on moisture free basis)	2.53-2.88	6.9-7.3

The method is quite simple, can be easily adopted and is highly effective. For treating 100 kg. of prawns, 2.64 kg. of sodium tripolyphosphate and 1.89 kg. of sodium dihydrogen phosphate dissolved in 23 litres of water would be required (Food Indus J 2;1968;14).

KX332 Fish - IDENTIFICATION OF FISH SPECIES

Torry has developed an electrochemical method of identifying fish species from samples of cooked or uncooked fish, a method which has commercial importance because of the possibility of substituting cheaper fish for the more expensive varieties. The method is based on the fact that each species of fish has a characteristic group of proteins in the cellular fluids of the muscle and that in an electric field they can be separated.

After electrophoretic separation the protein zones are stained with a soluble dye. Final effect is to produce a "pattern" for each species, no two species showing the same results. The system has been described as the "fingerprinting of fish". [Food Manufacture 43;1968;36].

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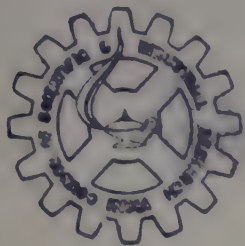
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ART III. Technical News Brief

92Z2 Protein PROTEIN FROM OIL

The second development took the form of an announcement by British Petroleum (BP) that a food-from-oil plant would be set up at the company's chemical complex at Grangemouth, Scotland.

The plant will cost £ 900,000 and will use as its raw material normal paraffin feedstock. It is due to come into operation early in 1970 with an output of 4,000 tons of protein a year.

BP was the first company in the world to apply a full-scale commercial process to manufacture protein foodstuffs from mineral oil. The first plant, announced last November, is sited in France.

Initially, output from the Grangemouth plant will be marketed as an additive for animal feedstuffs and as a substitute for fish and soya meals, but tests are in progress on its use as a human food. Feedstocks for the new plant will be made by BP at its refineries in Kent (South East England) and Dinslaken (Federal Germany). [Indian Dairyman 20;1968;283].

92Z2J Plant, Protein FOOD FROM GREEN LEAVES AND MINERAL OIL--TWO PROMISING DEVELOPMENTS

New hope for the future success of the battle against hunger is held out by two recent developments in Britain.

The first was the demonstration in London of a British machine producing high-quality protein from ordinary green leaves. The machine is claimed as an example of one of the inexpensive solutions to the problems of populations suffering chronic malnutrition.

Shown at the International Congress of Plant Pathology in London the machine, developed by the British Agricultural Research Council's Rothamsted Experimental Station, separates protein-bearing juices from the leaf fibre and then extracts protein by a cycle of heat coagulation and filtration.

A dark green substance is produced, the dry matter of which contains 60 to 70 per cent of protein and about 20 per cent of fat which, when made slightly acid, has the keeping qualities of cheese.

Canned or deep-frozen, the protein concentrate will keep indefinitely. [Indian Dairyman 20;1968;283].

LEAF PROTEIN MACHINE

A do-it-yourself machine to extract protein from green leaves has been devised by Prof. Norman Pirie, 61 year old head of the biochemistry department at Rothamsted experimental station, Harpenden, England. He claims it can extract 40 pounds of pure protein from one tone of ordinary leaves of plants like clover, wheat or mustard and meet the protein needs of 60,000 people.

According to officials of a British charity organisation which is appealing for funds to back its project to set up such machines in needy countries, a capital of about £8,000 (Rs.1,44,000) would be needed per machine, the annual running cost being under £10,000 (Rs.1,80,000). Part of this could be met by the sale of by-products usable as cattle feed.

Prof. Pirie's prototype is a big clanking iron affair of conveyor belts revolving drums and churning paddle wheels.

Some of the recipes using the protein are designed for India, which has been offered the know-how of the machine. Curry cubes made of flour, onion, curry powder, seasoning and leaf protein, are said to contain 31.9 per cent protein, 22.4 per cent of it from leaves. They are said to be very tasty, too. [Food Industries Journal 2;1968;21].

F39H Fruit FRUIT SULPHURING

The CSIRO Division of Chemical Engineering has developed a new method of fruit sulphuring for drying which requires the burner to operate for only an hour at the start of the sulphuring. The fruit is then sealed in airtight plastic tents for a further five hours. [Food Tech Austral 20;1968;332].

F3Z809M;a55 Egg shell, Strength GAUGE FOR MEASURING EGGSHELL STRENGTH

Everyone knows eggs have fragile shells, but some eggs are less fragile than others. This situation raises a problem of economic significance: What is the most efficient, reliable way to differentiate a tough shell from a fragile one? United States and Canadian scientists are cooperating to solve this problem.

Fragile shells cost US producers, packers and marketers about 50 million dozen broken eggs each year - a staggering financial loss to them. This loss is similarly great in Canada.

Before breakage can be minimised, a means must be found to distinguish tough-shell eggs from those more easily cracked, so that allowances can be made in handling, marketing and the design of machines.

Engineers and poultry scientists are comparing the effectiveness of a new beta back scatter gauge, and older methods for measuring strength of egg-shells. The atomic gauge measures eggshell strength by firing harmless beta energy at an egg and counting the energy that bounces back. [Food Industries Journal 2;1968;13].

X8(F3A).44 Bakery Industry - India INDIA-AUSTRALIA BAKERIES PROJECT

Under its Colombo Plan aid programme Australia is cooperating with the Indian Government to establish six modern automatic bakeries in India. The estimated cost to Australian aid funds is \$ 4917,000.

The bakeries are at Bombay (where there are two production units - Madras, NewDelhi, Calcutta, Ahmedabad and Ernakulam. On 2nd January 1968, the Bombay bakery which is the first to be completed was officially opened by the Minister for Food and Agriculture, Mr. Jagjivan Ram.

This joint project has been in progress for a number of years. It began in 1964, when Mr. E.E. Bond, Director of the Bread Research Institute of Australia, went to India as a Colombo Plan expert to carry out a survey of the Indian baking industry. Since then the Indian Government has provided buildings for the bakeries and has installed auxiliary equipment. Indian managers for the bakeries have been given special training in Australia under the Colombo Plan.

Australia has provided automatic bread-making machinery for each of the bakeries and designed the layout. Technical staff from Australia are now installing the equipment and bringing it into full production. The equipment was supplied by Baker Perkins Pty Ltd of Melbourne and was specially selected for its efficiency and adaptability to Indian conditions. Each bakery will be completely automatic in operation and will be capable of producing a wide range of high quality bread, sliced and wrapped.

The last of the six bakeries is expected to come into operation in October 1968. To begin with, the bakeries will produce a total of 55 million 400 g. loaves of bread a year, but they will be able to increase production to meet public demand. [Food Tech Austral 20;1968;331].

PART IV. Periodicals - Title Service

A GENERAL SCIENCE

AOaW:19(zQ) Science in relation to peace

COMFORT (A) and others. Why is man aggressive? Impact Sc Soc 18;1968;8

RÖLING (VA). Peace research, the science of survival. The keynote article for this number. Impact Sc Soc 18;1968;69.

AOaYB4 Science in relation to Social Pathology

LONSDALE (DK). Science and the good life. New Scientist 39;1968;370.

A.5 Science in Europe

European science is far from dead. Nature 218;1968;813.

D ENGINEERING

D8665 Sewage Purification

BORROUGH (PC). Contact stabilisation. Process Biochem 3;1968;35.

E CHEMISTRY

E:3 Analysis

E:3C5PAR Partition chromatography analysis

VINEK (H). Theory of partition chromatography. J Chromatog 36;1968;23

E6 Aliphatic compound

SMITH (JRL) and WADDINGTON (DJ). Gas chromatographic analysis of aliphatic alcohols, diols and ethers using aromatic polymers. J Chromatog 36;1968;145.

E611 Methane

E611,383 Esters of Methionine

NJAA (LR) and others. Antioxidant properties of methionine esters. Nature 218;1968;571.

E68 Carbohydrates

E68:3C5T Thin layer chromatographic analysis of carbohydrates

LATO (M) and others. Analysis of carbohydrates in biological fluids by means of thin layer chromatography. J Chromatog 36;1968;191

E6813 Glucose

STEWART-TULL (DES). Determination of amino sugars in mixtures containing glucosamine, galactosamine and muramic acid. Biochem J 109;1968;13.

E688 Polysaccharide

E688:3C58 Gas liquid chromatographic analysis of polysaccharides

DUTTON (GGS) and others. Simultaneous estimation of polyhydric alcohols and sugars by gas-liquid chromatography. Applications to periodate oxidised polysaccharides. J Chromatog 36;1968;152.

E92X1 Nucleotide

JACOB (TM). Oligonucleotides and polynucleotides as tools for biochemical studies. J Sc Industr Res 27;1968;316.

E92Z Amino acid

HATCH (FT) and BRUCE (AL). Amino acid composition of soluble and membranous lipoproteins. Nature 218;1968;1166.

E92Z2 Protein

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WOOLUM (JC) and others. Electron spin resonance of ironnitric oxide complexes with amino acids, peptides and proteins. Biochim Biophys Acta 160;1968;311.

E92Z2:4 Protein synthesis

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BRETSCHER (MS). Translocation in protein synthesis: A hybrid structure model. Nature 218;1968;675.

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E92Z2K Animal Protein

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E95 Pigments

SUBBARAYAN (C) and CAMA (HR). Carotenoids. J Sc Indus Res 27;1968;306.

E97 Vitamin

PELLETIER (O). Chemical determination of niacinamid in multivitamin preparations. JAOAC 51;1968;828.

E97:3 Vitamin, Analysis

MURRAY (TK) and others. Determination of vitamins D-2 and D-3 in pharmaceuticals by gas liquid chromatography. JAOAC 51;1968;839.

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E981 Chlorophyll

E981:34C5T Quantitative thin layer chromatographic analysis of chlorophylls

J. JEFFREY (SW). Quantitative thin layer chromatography of chlorophylls and carotenoids from marine algae. Biochim Biophys Acta 162;1968;271

E982 Enzyme

MARUSHIMA (Y) and others. Chemical evidence for the Phillips model of action of hen egg white lysozyme. Nature 219;1968;265.

E982:(J37971) Papain Enzyme

DR. TH (J) and others. Structure of papain. Nature 218;1968;929.

E995 Collagen

CONSDEN (R) and KIRKANE (JA). Cross linking in collagen by potassium nitrosyldisulphonate. Nature 218;1968;957.

E996 Sterol

E996:4 Sterol synthesis

MIGICOVSKY (BB). Glycerol as an inhibitor of cholesterol synthesis. Can J Biochem 46;1968;859.

E9G BIOCHEMISTRY

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F688 Polysaccharide

FOSTER (FH). Dextran-manufacture and use part 1. Process Biochem 3;1968;15.

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I21:(E9G) Yeast, Biochemistry

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I22:(E92Z2) Algae, Proteins

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J:43973:634 Rodenticide

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J3512:(E94:4) Spinach, Fatty acid, Synthesis

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J37:93 Fruit, Physiology

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J371 Apple

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J3751:7:8.441 Mango, Storage in South India

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J3788 Peaches

J3788:(E982) Peaches enzyme

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J37943 Tomato

J37943:(E9G) Tomato, Biochemistry

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J37956 Cucumber

J37956:93 Cucumber, Physiology

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J38 Cereals

J38:4386:634 Cereals, Insecticide

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J382 Wheat

J382:(G;6) Wheat, Genetics

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J386 Barley

J386:(E982) Barley, Enzyme

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J38833 Beans

J38833:93 Bean, Physiology

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J481 Coffee

J481:4:634 Coffee, Pesticide

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J671 Pepper

J671:437.4413C Pepper, Nematode in Coorg

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J93 Vegetable

J93:4:634 Vegetable, Pesticide

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K86:0371).4411 Apple pests of Madras

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K867 Lepidoptera

JERNY (T) and others. Induction of specific food preference in lepidopterous larvae. Entomol Exper Applic 11;1968;211.

KX ANIMAL HUSBANDRY

KX:10aLX3;91 Animal feed in relation to drugs

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KX332 Fish

KX332:(E982) Fish, Enzyme

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KX332:(E995:3) Fish, Collagen analysis

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KX334 Pig

KX334:1 Pig nutrition

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KX351 Fowl

KX351:1 Fowl, Nutrition

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:33 Metabolism

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:573 Nutrition

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:5730 Dietetics

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M98 Packaging

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X ECONOMICS

X8(A) Industry

X8(A):51 Industrial Marketing

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X8(KX:1).44 Animal Feed Industry in India

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Y SOCIOLOGY

Y3:7:2 Extension

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CENTRAL FOOD TECHNOLOGICAL
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LIBRARY BULLETIN



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KX332 Fish
KX332:(E9G) Fish, Biochemistry

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L:33 Metabolism
L:461 Nutritional Deficiency
L:573 Nutrition
L:5730 Dietetics
L12:46 Obesity
L293:46 Diabetes
L72 Brain

L9C CHILD
L9C:461 Nutritional Deficiency,
Child
L9C:573 Child, Nutrition

M USEFUL ARTS
M98 Packaging

S PSYCHOLOGY
S:22 Taste

T EDUCATION
T4 University Education

X ECONOMICS
X8(A) Industry
X8(A):8 Industrial Management
X8(F1) Chemical Industry
X8(F39ZF) Confectionery Industry
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308;a241:k5 Grain, Microbial infection, Prevention
CLO COAT INHIBITS GRAIN DECAY

The use of mild organic acids to inhibit microbiological decay in moist grain has emerged successfully from extensive trials in the UK. The technique is ready for farm use next year. BP chemicals has announced its intention to market its product propcorn (aliquid preservative based on propionic acid) on a national scale in 1969.

Farm trials in the past two years have confirmed that moist grain sprayed with propcorn can be stored in good condition for periods of at least 12 months without the need to use sealed containers or refrigeration. Suppression of moulds and bacteria not only prevents dry matter loss, and thus preserves the full value of the grain, but also ensures that it remains free flowing so that it can be removed easily from stored. Any type of container can be used. Propcorn treated grain can even be left heaped on the barn floor. The preservative effect persists when treated grain is ground or rolled for feeding livestock.

In feeding trials with treated grain, cows, bullocks, sows, pigs and chickens have shown no ill effects and generally their performance has been no different from that of animals fed on moist grain stored in sealed silos. At Shuttleworth Agricultural College dairy cows whose barley ration was prepared from Propcorn treated grain throughout the winter gave milk that was equal in quality to that from animals from the same herd fed with untreated barley. Treated grain has been incorporated into chicken feed on commercial broiler farms without any noticeable effect on feed intake, mortality, live weight or feed utilization.

The quantity needed to treat grain is small, ranging from one to three lb/ton depending on moisture content. Flour companies are manufacturing special applicators. [New Scientist 40(617);1968;28].

39h Bean LOUR REVERSION IN BEANS

Green colour reversion occurring after sterilization of previously blackened beans is generally most pronounced in beans with a comparatively high chlorophyll content. It is shown to be due to the presence of traces of adventitious Zn that form green complexes with the pheophytin and pheophorbins that occur as transformation products of chlorophyll. [Food Tech Australia 20(8);1968;381].

9E1;eE26 Potato, Discolouration DISCOLORATION IN POTATO PRODUCTS

The undesirable discoloration of potatoes may be in the form of after-cooking blackening, enzymic browning and non-enzymic browning. After-cooking blackening and enzymic browning are considered in detail by T. Swain, J. C. Hughes and L.W. Mapson in Plant Science symposium Proc., 63-82(1966). Certain varieties tend to blacken after cooking and this discoloration appears in frozen French Fries, Chips, Canned Potatoes and dehydrated potatoes. Blackening is usually caused by Oxidation of tyrosine to melanin in bruised or otherwise damaged potatoes but that obtained in cooked potatoes is caused by the formation of a chelate between ferric iron and chlorogenic acid. Blackening increased when higher concentrations

of chlorogenic acid are present and decreases with increasing citric acid. Two methods for reducing the blackening properties are mentioned.

Causes of enzymic browning are given and it is shown that there is a direct correlation between tyrosine concentration and discoloration. The addition of traces of chlorogenic acid increases the rate of tyrosine oxidation. The tyrosine present increases with the water supply during growth and a wet season therefore increases browning. Non-enzymic browning is caused by the reaction between reducing sugars and amino acids and the level of sugars should be low to give good colour. [Food Tech Australia 20(8);1968;380].

F39H:xP,C Fruit, Preservation, Storage FRUIT AND VEGETABLE STORAGE

Recent work at the US Agricultural Research Council indicates that, while meat is stored in atmospheres of high carbon dioxide and low nitrogen content, almost the opposite conditions may be suitable for the storage of fruit and vegetables. It was found that Victoria plums stored in 1 per cent oxygen at 1°C instead of in air retained their quality for a longer time. Apples are increasingly often stored in atmospheres of 2-1.5 per cent oxygen, and it is reported from the USA that flowers, strawberries, and lettuce are being successfully stored and transported in atmospheres containing little or no oxygen, obtained by evaporating liquid nitrogen. [Food Tech Australia 20(8);1968;381].

F39R1;a13 Tomato, Consistency CONSISTENCY OF TOMATO PRODUCTS

Recent experiments conducted by the Western Utilization Research Laboratory, US Department Agriculture, Calif., indicate that acidity can control the consistency of tomato products as well and better than heating techniques. The acid treatment gives a higher yield of tomato products from the raw material. [Food Tech Australia 20(8);1968;381].

F3C Bread PUTTING NEW LIFE INTO THE LOAF

Everybody knows that bread is not what it used to be. An increasingly large proportion is factory made and the economics of concentrated production coupled with distribution over a wide area, means that bread is already stale when the housewife picks it from the shelves in the supermarket. It has also lost most of its old fashioned flavour. At the Lord Ruck Research Centre at High Wycombe (it is part of the Rank Hovis McDougall group and was only opened last year) a concentrated attack is only made on the problem. A complete answer has yet to emerge but there are indications that a solution is well on the way.

The key to the problem of staleness is the chemical and physical changes that occur in the starch. It crystallizes and it is this which causes the typical sandy texture of stale bread. Enzymes, it is known, can change the characteristics of the starch-prevent crystallization at the same time diminish the qualities which enable the starch to make its vital contribution to the structure and quality of the bread. The scientists now think that they have tracked down such an enzyme which may be exactly right and experiments have been encouraging.

Flavour is another matter. People like the nice, thick crust of a cottage loaf but also the convenience of a ready-sliced loaf. They can't have both. To slice well, a loaf must have a thin crust; but it is the thin crust where most of the flavour comes from. The approach to this dilemma has been to investigate the complex nature of the flavour and the processes from which it results. It is already known that it contains over 70 different components. There is also a lot of effort going into the development of new varieties of flours with distinctly new baking qualities. [New Scientist 39(614);1968;532].

186 Entomology

NEW INSECT HORMONE SYNTHESISED IN AUSTRALIA

The Australian National University's Research School of Chemistry is reported to have perfected a synthesis of an insect hormone which will interfere with the normal life cycle and prevent reproduction.

It is said to be the biggest advance in pest control since the discovery of DDT. [Chemical Age 98(2566);1968;14.

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